

## F3D SKYKNIGHT

Never one of the most glamorous of Navy/Marine fighters, the Douglas F3D *Skyknight* shared with its Douglas stablemate, the AD *Skyraider*, the distinction of serving with combat squadrons in both the Korean and Vietnamese Conflicts.

The Navy turned to jet power after WW II for its carrier fighters. A night fighter was needed. Douglas received a contract for three prototype XF3D-1s in April 1946. The first flew in March 1948. Typical of early jet fighters, it was a straight wing design. A wide cabin providing side-by-side seats for pilot and radar operator, engines semi-buried in each side of the lower fuselage, four 20mm guns under the radar in the nose and large internal fuel capacity resulted in a bulky fuselage. An unusual feature was the escape system, depending primarily on a bailout chute, out through the bottom of the fuselage.

Subsequent flight testing confirmed the basic soundness of the design and led to correction of problems unearthed in initial carrier operation of this large carrier jet aircraft.

Although underpowered with its two Westinghouse J34 jet engines, 28 aircraft were bought while the -2 was being developed to use the higher powered Westinghouse J46. Delays in the J46 program led to use of updated J34s and the *Skyknight* never became a high performance aircraft.

Initial flights of production F3D-1s in early 1950 led to service introduction late in the year, with VC-3 and VMF(N)-542. A swept wing version, the F3D-3 was also contracted for, but was destined to be stillborn, being cancelled before reaching flight.

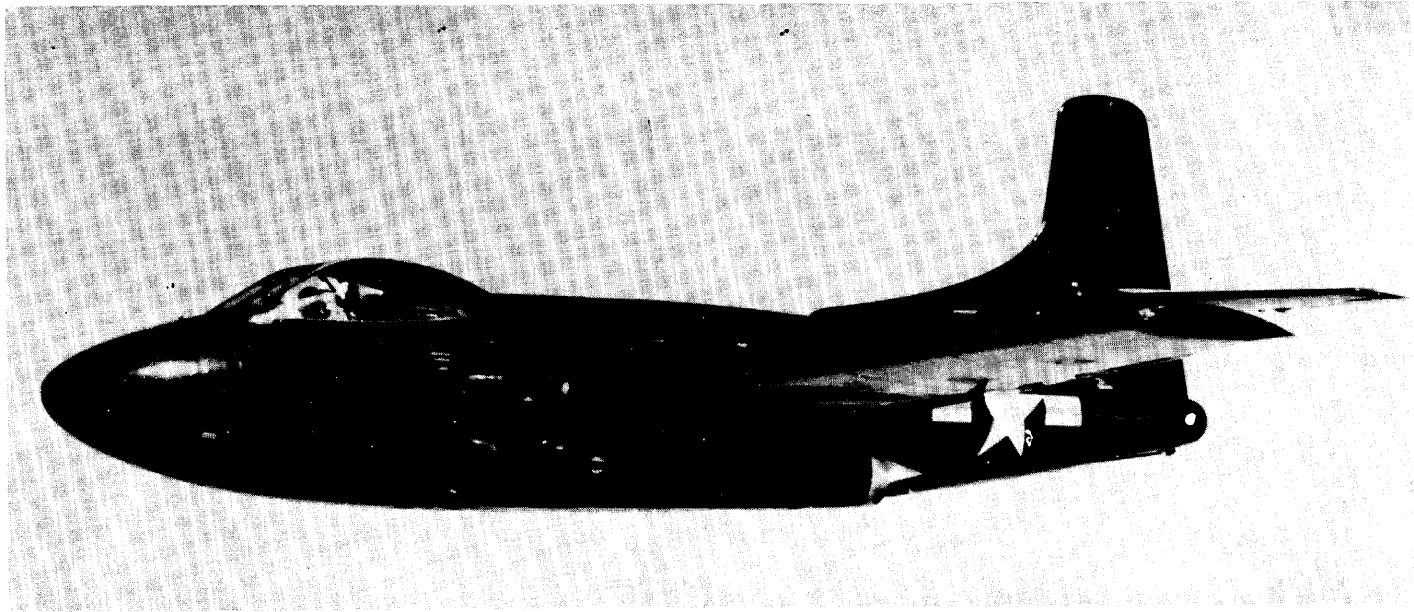
Another foresighted project involved the F3D in 1950: one of the XF3D-1s was modified to carry and fire four *Sparrow* Is.

The first F3D-2 flew in February 1951. Over the next two years, 237 were delivered. Sixteen of these were F3D-2Ms in the *Sparrow I* configuration, prototyped by the one XF3D-1M in 1950. The F3D-2s served with Navy composite and Marine night fighter squadrons, but went into combat in Korea only with Marine land-based squadrons, in the fall of 1952.

As land-based night fighters, the F3Ds were effective, destroying both jet and prop aircraft in night engagements. However, for carrier use, smaller, single-place night fighters were considered more satisfactory.

By the late Fifties, as the F4D and F3H came into service, the *Skyknights* were converted for trainers and electronic warfare. F3D-2Ts and -2T2s, depending on the radar and fire control system installed, were used for training *Demon* and *Skyray* pilots in radar intercept techniques. The Marines used converted F3D-2Qs as tactical ECM aircraft.

By 1960, the F3Ds were being replaced by later designs. With the DoD redesignations in 1962, the -2Qs became EF-10Bs, and the -2T2s still in service became TF-10Bs. The TFs lasted until late 1963, while the EFs continued, flying combat through much of the Vietnam Conflict before their retirement.



# STANDARD AIRCRAFT CHARACTERISTICS

## F3D-2 "SKYKNIGHT"

DOUGLAS



**POWER PLANT**

NO. & MODEL.....(2) J34-WL-34  
 MFR.....Westinghouse  
 TYPE.....11 Stg. Axial Compr.  
               2 Stg. Turbine

**RATINGS**

	Lbs.	⊙ Rpm	Alt.
T. O.	3,400	12,500	S.S.L.
MIL.	3,400	12,500	S.S.L.
NORM.	3,000	11,930	S.S.L.

SPEC. NO. WAGT-2404E-2B

**ORDNANCE****GUNS**

No.	Size	Location	Rds.
4	20 mm	Nose	800

Mr. 20 Mod. 0 Gunsight

**BOMBS AND ROCKETS**

Type	Size	Location	No.
Bomb	2,000#	Inner Wing	2
Bomb	1,000#	Inner Wing	2
Bomb	500#	Inner Wing	2
A.R.	11.75"	Inner Wing	2

MAX. BOMB CAP.....4,000 lbs.

**MISSION AND DESCRIPTION**

The mission of the F3D-2 airplane is to search out and destroy enemy aircraft at night.

This twin-jet fighter is designed to operate from aircraft carriers with the aid of a catapult, or from land bases.

Side by side accommodations are provided for the pilot and a radar operator.

The airplane is conventional in structure with all-metal two-spar wing and semi-monocoque fuselage. Tricycle landing gear, slotted flaps and wing folding are hydraulically operated.

Hydraulically operated fuselage speed-retarding brakes with hand controls are provided. These may be used for maneuvering or to increase the angle of descent.

Pilot escape provisions are furnished both through the power operated escape hatch and through a special high speed bail-out chute on the bottom of the fuselage.

**DIMENSIONS**

WING AREA.....	400 sq. ft.
SPAN.....	50' - 0"
FOLDED SPAN.....	26' - 10"
LENGTH.....	45' - 5"
HEIGHT.....	16' - 1"
HEIGHT*.....	16' - 6"
TREAD.....	10' - 6"
M.A.C.....	8' - 4"

\* Wings Folded

**WEIGHTS**

Loadings	Lbs.	L.F.
EMPTY.....	14,989.....	
BASIC.....	15,500.....	
DESIGN.....	19,700..5.5	
COMBAT.....	21,374..5.1	
MAX.T.O..(Field).	26,731*.4.0	
MAX.LAND (Field).	24,500.....	

All weights are actual.

\*Maximum anticipated loading.

**FUEL AND OIL**

Gals.	No. Tanks	Location
650	1 (Seal.)	Fuse., Fwd.
290	1 (Seal.)	Fuse., Ctr.
410	1 (Seal.)	Fuse., Aft
300	2	Wing, Drop

FUEL GRADE....115/145  
 FUEL SPEC., MIL-F-5572

**OIL**

CAPACITY (Gals.).....4.0  
 GRADE.....1010  
 SPEC.....MIL-C-6081

**ELECTRONICS**

VHF COMMAND.....(2) AN/ARC-1  
 UHF COMMAND.....AN/ARC-27  
 (With provisions for alternate installation of (1) AN/ARC-1 VHF) P.S.I.  
 (Replaces (2) AN/ARC-1)  
 INTERPHONE.....AN/AIC-4, -4A  
 D.F. EQUIPMENT.....AN/ARN-6  
 HOMING.....AN/ARN-21  
 (P.S.I., Repl. for AN/ARR-2A and AN/ARN-6)  
 HOMING REC.....AN/ARR-2A  
 (Continued on NOTES sheet)

## PERFORMANCE SUMMARY

TAKE-OFF LOADING CONDITION		(1) FIGHTER Full Internal Fuel	(3) FIGHTER 2-150 Gallon External Tanks		
TAKE-OFF WEIGHT	lb.	24,614	26,731		
Fuel	lb.	8,100	8,100/1,800		
Payload (Ammunition)	lb.	450	450		
Wing loading	lb./sq.ft.	61.5	66.8		
Stall speed - power-off	kn.	97.1	101.2		
Take-off run at S.L. - calm	ft.	2,080	2,500		
Take-off run at S.L. 25 km. wind	ft.	1,270	1,530		
Take-off to clear 50 ft. - calm	ft.	---	---		
Max. speed/altitude	(1) kn./ft.	426/15,000	387/10,000		
Rate of climb at S.L.	(2) fpm	2,970	2,375		
Time: S.L. to 20,000 ft.	(2) min.	9.9	13.7		
Time: S.L. to 30,000 ft.	(2) min.	20.9	31.6		
Service ceiling (100 fpm)	(2) ft.	36,700	32,400		
Combat range	n.mi.	995	1,195		
Average cruising speed	kn.	395	395		
Cruising altitude(s)	ft.	34,100/39,800	31,250/39,200		
Combat radius	n.mi.	415	520		
Average cruising speed	kn.	395	395		
COMBAT LOADING CONDITION		(2) CLEAN			
COMBAT WEIGHT	lb.	21,374			
Engine power		Military			
Fuel	lb.	4,860			
Combat speed/combat altitude	kn./ft.	428/35,000			
Rate of climb/combat altitude	fpm/ft.	550/35,000			
Combat ceiling (500 fpm)	ft.	35,500			
Rate of climb at S.L.	fpm	3,570			
Max. speed at S.L.	kn.	458			
Max. speed/altitude	kn./ft.	460/10,000			
LANDING WEIGHT	lb.	17,799			
Fuel	lb.	1,285			
Stall speed - power-off	kn.	82.6			
Stall speed - with approach power	kn.	80.6			

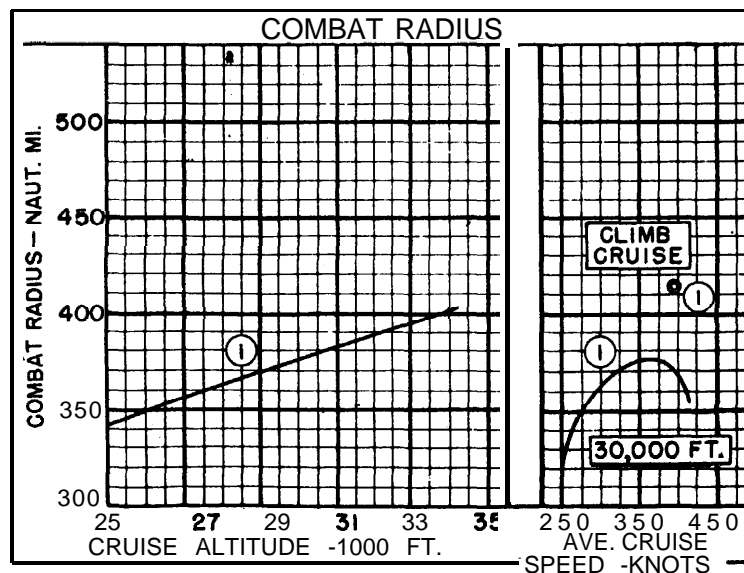
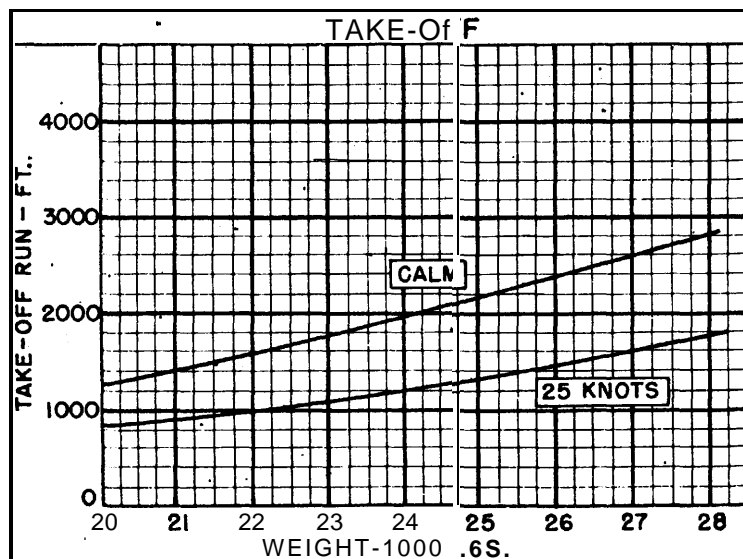
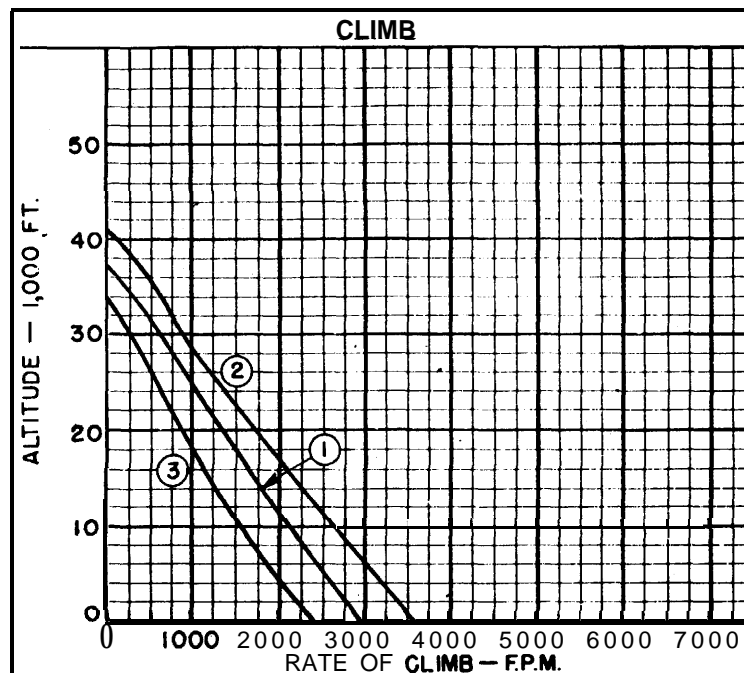
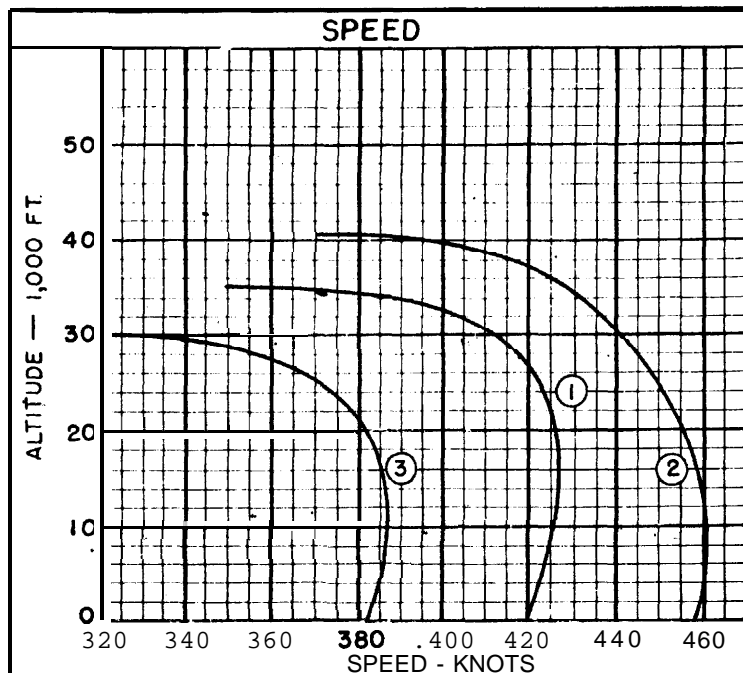
## NOTES

- (1) Normal Power  
(2) Military Power

Performance is based on calculations and preliminary NATC flight test of F3D-2 airplane.

Range and radius are based on engine specification fuel consumption data increased by >\$

External store pylons are not included in conditions (I) and (Z).



( ) LOADING CONDITION COLUMN NUMBER

# NOTES

**Spotting:** 200 ft. length is required to spot 17 airplanes on the 96 ft. wide deck immediately aft of the forward ramp on CV-9 class carriers.

## GENERAL PURPOSE AND ESCORT FIGHTER COMBAT RADIUS PROBLEM (GAS TURBINE)

**WARM-UP, TAXI, TAKE-OFF:** 5 minutes at normal power.

**CLIMB:** To cruising ceiling at military power. (Cruising ceiling = altitude for 300 ft./min. at normal power.)

**CRUISE-OUT:** At V for long range at cruising ceiling.

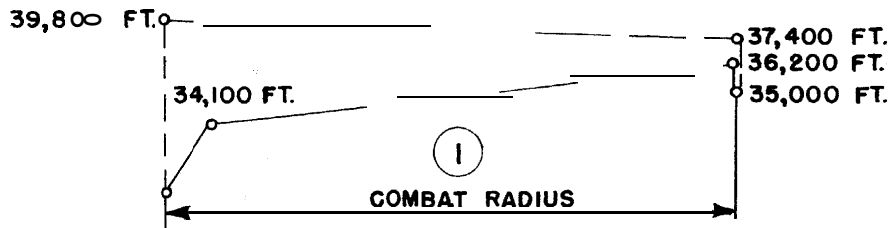
**DESCEND:** To 35,000 ft. (No fuel used, no distance gained.)

**COMBAT:** At 35,000 ft. for 20 minutes at military power. (Assume combat concluded at initial cruise-back altitude).

**CRUISE-BACK:** At V for long range at cruising ceiling.

**RESERVE:** 20 minutes at V for maximum endurance at Sea Level plus 5% of initial fuel load.

$$\text{COMBAT RADIUS} = \text{CLIMB} + \text{CRUISE-OUT} = \text{CRUISE-BACK}$$



Based on F-5 problem, combat radius would increase to 485 n.mi. for Condition (1) and 585 n.mi. for Condition (3).

## ELECTRONICS (Continued):

UHF D.F.....AN/ARA-25 (P.S.I.)

RADIO ALTIMETER.....AN/APN-1

RADAR SYSTEM.....AN/APQ-35A, -35B

IFF EQUIPMENT.....AN/APX-6

IFF (I-R UNIT).....AN/APX-17

(Planned Service Installation)

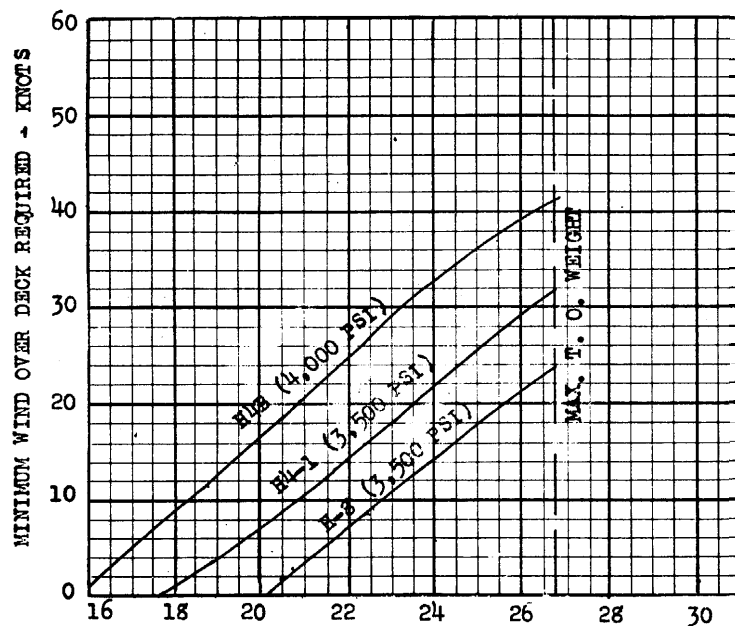
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Standard Aircraft Characteristics NAVAER 1335F (REV. 1-49)

## CARRIER SUITABILITY

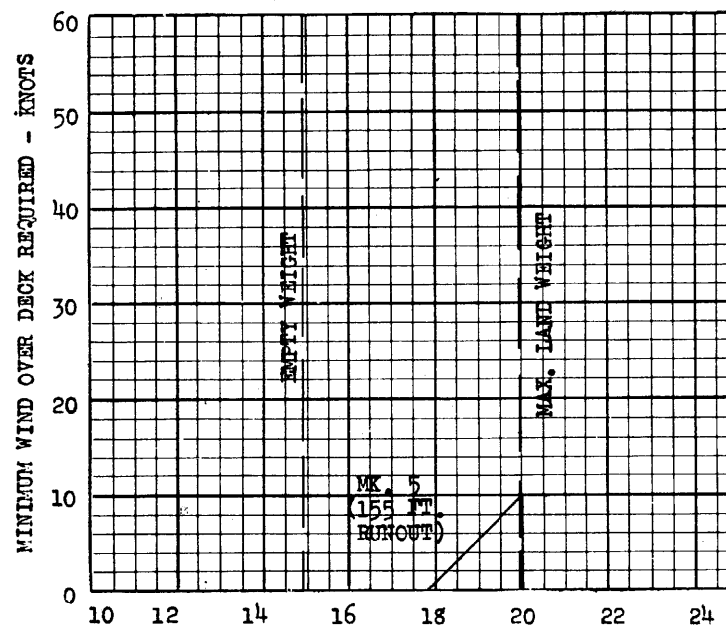
## WIND OVER DECK REQUIRED FOR CATAPULTING VS. GROSS WEIGHT

Based on Minimum Safe Take-Off Speed



## WIND OVER DECK REQUIRED FOR LANDING VS. GROSS WEIGHT

Based on Approach Speed of 1.2 Power-Off Stall Speed



NOTE: No wind required for Mk. 7 arresting gear